

Life History and Control of the Cattle Fever Tick and Their Bearing  
on Human Welfare

(A) Nature of Work

1. History and Evolution

In 1889 a parasitologist of the former Bureau of Animal Industry worked out the essential facts in the life history of the cattle fever tick which, up to that time, had not been adequately investigated. As a matter of fact, the tick genus that was afterwards shown to be the conveyer of Texas Fever had not even been named, so that the investigator named it Boophilus (cattle lover), and determined for the first time that this parasite spent its entire developmental cycle, beginning with the seed tick that crawls from the grass onto cattle, on only one host, instead of dropping off the host after each molt. This in itself was a novel discovery so far as tick life histories were concerned. The investigator also noted the time required for the various stages in the life cycle of the tick to pass through their development, beginning with the egg up to the complete engorgement of the female tick that takes place before the parasite drops off the animal and falls to the ground. These experiments demonstrated, moreover, that it was possible to rear on cattle the seed ticks that hatched from the eggs deposited by the engorged females on the ground. This facilitated somewhat later the crucial Texas Fever experiments which were carried out in the same Bureau by another investigator beginning in 1890.

Another noteworthy contribution made a few years later by the investigator who worked out the life cycle of the fever tick, was based not on animal experimentation but on the analysis of data bearing on the life history of the cattle fever tick and its relation to the transmission of the disease which came to be known as Texas fever, and is now generally known throughout the world as tick fever. This analysis lead the investigator to outline procedures on how tick eradication and, therefore, the eradication of the disease tick fever which it conveys, could be accomplished.

In 1907 extensive investigations were made in the Bureau of Animal Industry on the effects of arsenical dips on ticks. Arsenic was first introduced as a constituent of dips for the destruction of fever ticks in Australia, and was later tested in Cuba during the first occupation of that country by United States military forces. Additional tests were made by the Livestock Sanitary Board of Texas, with the result that it became apparent that arsenical dips held strong promise of being useful in a program of tick eradication. As a result of tests made in the field by workers of the Bureau of Animal Industry, it was determined that ticks on infested cattle that were dipped twice, at an interval of about two weeks, in an arsenic, soda and pine tar mixture (containing arsenic equivalent to 0.22 of 1 percent of arsenic trioxide in the form of sodium arsenite) would be destroyed. It was also demonstrated that cattle so dipped could be moved to clean ground without carrying viable ticks with them. In these investigations it was found that arsenic did

not kill all the ticks promptly and that some few even survived long enough to deposit eggs. In such cases, however, the ticks that survived to deposit eggs, deposited smaller numbers than they normally did, and of those so deposited only few, if any, hatched and that the seed ticks hatching under these conditions did not survive very long. Moreover, the investigations showed that cattle so dipped, even if they continued to occupy tick-infested places, rarely became reinfested until several days had elapsed. It is evident, therefore, why the method of tick eradication which came into general use as a consequence of these investigations, namely, dipping in arsenical solution every 14 days, proved effective in freeing cattle from ticks. And it was this procedure as outlined that ultimately lead to the eradication of tick fever, or piroplasmosis, from the United States.

## 2. Purpose and Objectives

This work was undertaken with the expectation that by persistent application to experimentation with agents designed to destroy ticks, a method would be discovered whereby it would become possible to free all cattle from this scourge. These objectives were definitely realized and the campaign of tick eradication was begun in 1906.

## 3. Current Work

There is no further current research on this problem.

## (B) Accomplishments and Their Significance

Before the research outlined above was undertaken cattle in all of the States in the southern portion of the United States, from Virginia

to California and all the way down to our southernmost boundaries, were tick-infested. Aside from the disease tick fever from which these animals suffered, they also were plagued by ticks per se, because these parasites act as a constant drain on the vitality of the hosts on which they live. The infested cattle were thin, anemic, and because of their poor physical condition they were a prey to various infectious diseases and to sudden changes in temperature. Well-bred animals from the North that were brought into the South, in order to improve the native beef and dairy herds, had no resistance to tick fever and were readily victimized by it. Many of these animals died. There was actually no way of improving the cattle industry of the South without getting rid of the fever tick.

Although there was logic behind the entire program of tick eradication, and the eradication plan was based on a sound background of biological science, the road that lay ahead for ~~which~~ those engaged in the program was, indeed, a difficult one. It was necessary, in the first place, to convince the farmers that ticks actually conveyed the disease tick fever. In short, an educational campaign of great proportion had to be carried out in order to make the eradication program possible. Actually, the campaign of eradication lasted for about 40 years, during which county after county in the South became involved in the eradication campaign. Perhaps the best illustration that can be given of the first palpable evidence of the value of tick eradication, aside from the good it did in enabling the South to develop its beef cattle and dairy cattle industries, was that during the drought years in the early 1930's it

was possible to salvage many cattle by moving them out of the drough areas into the South where there was enough feed for them. Had not the South been freed of ticks it would not have been possible to move northern cattle into that area, for the simple reason that these animals were hypersusceptible to tick fever and would have died by contact with tick infested cattle.

There can be no question but that much of the agricultural development in the South that has taken place during the last few decades is the direct result of tick eradication. Without that, the beef and dairy industries in the South would have been no farther advanced than they were in the beginning of the present century. Actually, tick eradication created a revolution in the agricultural economy of the South by making it possible to develop that area into an important livestock region.